Henry Skinner

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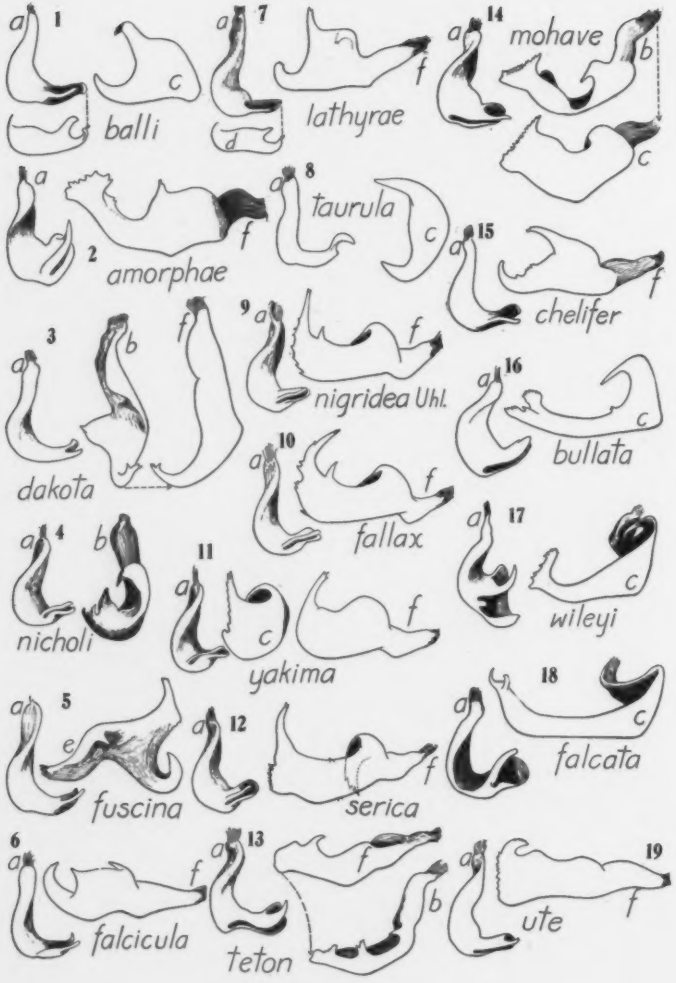

MALE GENITAL CLASPERS OF SPECIES OF LOPIDEA.—KNIGHT.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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A Fourth Paper on the Species of Lopidea (Heteroptera, Miridae).[1]

By HARRY H. KNIGHT, University of Minnesota, St. Paul, Minnesota.

(Plate II.)

Lopidea amorphae new species (Plate II, Fig. 2).

♂. Length 5.9 mm., width 2 mm. *Head:* width 1.1 mm., vertex .34 mm. *Antennae:* segment I, length .60 mm.; II, 2.09 mm., thickness .114 mm., tapering to more slender on apical half; III, 1.2 mm.; IV, .40 mm. *Pronotum*: width at base 1.84 mm. Genital claspers (fig. 2) indicate a very close relationship with *reuteri,* but in the large series examined the distal portion of the right clasper shows differences that are constant. Hemelytra with red areas bearing fine yellowish pubescence, while in *reuteri* the same areas bear black pubescent hairs; smaller than *reuteri* and more yellowish in color, the majority of specimens more yellowish than red. Breeds on *Amorpha fructicosa* where the nymphs and adults were taken in numbers.

♀. Length 6.3 mm., width 2.3 mm., very similar to the male in form and coloration.

[1]Published, with the approval of the Director, as paper No. 353 of the Journal Series of the Minnesota Agricultural Experiment Station.

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Holotype: ♂ July 8, 1922, Ramsey County, Minnesota (H. H. Knight), taken on *Amorpha fructicosa,* found growing on bank of Mississippi river; Minnesota University collection. *Allotype*: same data as type. *Paratypes*: 16 ♂ 14 ♀, taken with types; 9 ♂ 26 ♀ July 18, 1922, type locality (H. H. Knight). 2 ♂ 2 ♀ July 2, 1920, type locality (P. B. Lawson).

Lopidea lathyrae new species (Plate II, Fig. 7).

♂. Length 5.9 mm., width 1.9 mm. *Head*: width 1.11 mm., vertex .65 mm. *Antennae*: segment I, length .65 mm.; II, 2 mm., cylindrical; III, 1.58 mm.; IV, .61 mm. *Pronotum*: width at base 1.71 mm. Size, form and color very suggestive of *confluens* Say; deep red, legs, antennae, pronotal disk except lateral and anterior margins, scutellum, broad stripe each side of commissure and membrane black; clothed with fine yellowish pubescence on the red areas but black over the dark surface, with a few sericeous, yellowish pubescent hairs about margin of calli. Genital claspers (fig. 7) distinctive of the species.

♀. Length 6.2 mm., width 2.2 mm.; very similar to the male but with embolium and outer half of cuneus pale.

Holotype: ♂ July 6, 1919, Anoka County, Minnesota (H. H. Knight); Minnesota University collection. *Allotype*: taken with the type. *Paratypes:* 75 ♂ ♀, taken with the types on *Lathyrus venosus.* DAKOTA—3 ♂ 6 ♀ July 30, 1920, Turtle Mountains (T. H. Hubbel). MINNESOTA—♂ July 10, 1920, Morrison County (A. A. Nichol). ♀ July 2, 1919, Mille Lacs County (V. R. Haber.) ♂ Aug. 6, 1910, Koochiching County. 5 ♂ 1 ♀ June 19, 1921, Ramsey County (H. H. Knight.) CANADA, MANITOBA—♀ July 20, 1915, 2 ♀ July 18, 1916, Aweme (N. Criddle). SASKATCHEWAN—♂ July, 1922, Saskatoon (A. E. Cameron).

In Anoka County the writer found this species so numerous that in spots the host plants were largely killed. From this observation it would appear that this insect may be regarded as a potential pest of cultivated vetches.

Lopidea balli new species (Plate II, Fig. 1).

♂. Length 5.7 mm., width 2.2 mm. *Head*: width 1.21 mm., vertex .70 mm. *Antennae*: segment I, length .63 mm.; II, 2.2 mm., thickness .10 mm., very slightly more slender on apical one-fourth. *Pronotum*: width at base 1.74 mm. Genital claspers (fig. 1) indicate a close relationship with *lathyrae,* but in form broader and with less blackish on

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the dorsum; pronotum red to roseous, calli scarcely darkened; pubescence nearly as in *lathyrae*, but basal half of clavus bearing sericeous, silvery pubescence, the dark hairs on embolium and outer half of corium becoming yellowish apically.

♀. Length 6.1 mm., width 2.2 mm.; very similar to the male in form and coloration.

Holotype: ♂ July 22, 1900, Denver, Colorado (E. D. Ball); author's collection. *Allotype:* ♀ Aug., 1906, Glen, Sioux County, Nebraska (H. G. Barber). *Paratypes*: 1 ♂ 1 ♀, taken with allotype.

Lopidea chelifer new species (Plate II, Fig. 15).

♂. Length 5.3 mm., width 1.9 mm. *Head*: width 1.17 mm., vertex .64 mm. *Antennae:* segment I, length .63 mm.; II, 2.03 mm., nearly cylindrical; III, 1.36 mm.; IV, .39 mm. *Pronotum*: width at base 1.66 mm. Genital claspers (fig. 15) indicate a relationship with *balli*, but differences are apparent, the dorsum also more thickly clothed with dusky to black pubescence; femora pale fuscous and with black dots.

Holotype: ♂ Aug. 1-15, 1916, Jemez Springs, New Mexico (J. Woodgate); author's collection.

Lopidea dakota new species (Plate II, Fig. 3).

†*Lomatopleura caesar* Uhler, Hemip. Colo., p. 31, 1895.

♂. Length 6.4 mm., width 2.5 mm. *Head*: width 1.22 mm., vertex .77 mm. *Antennae*: segment I, length .77 mm.; II, 2.44 mm., thickness .09 mm., tapering to slightly more slender apically; III, 1.57 mm.; IV, .57 mm. Size and color very similar to *reuteri;* genital claspers (fig. 3) indicate a close relationship with *instabilis* but the antennae are more slender; dorsum clothed with stiff, suberect black hairs which in length nearly equal thickness of antennal segment II.

♀. Length 6.9 mm., width 2.4 mm.; more robust than the male but very similar in form and coloration. Named after the Dakota Indians, the largest division of the Siouan family.

Holotype: ♂ July 12, 1920, Cass County, North Dakota (A. A. Nichol); author's collection. *Allotype:* same data as the type. *Paratypes:* COLORADO—2 ♂ Aug. 3, 1894, Colorado Springs; ♂ June 5, 1894 Fort Collins (C. P. Gillette). 3 ♂ 1 ♀ August, Denver (N. Banks). ♂ July 22, 1900, Denver; ♂ July 13, ♀ July 16, 1900, Fort Collins (E. D. Ball). ♂, "Colo. Spr."; 3 ♂, "Colo. 1599, 1606." ♀ July 22, 1900, Pueblo. MINNESOTA—♂ ♀, Big Stone County; ♂ ♀, Traverse County (O. W. Oestlund). NEBRASKA—♂ Aug., 1903, Glen,

Sioux County (H. G. Barber.) MONTANA—♂ August 24, ♀ Aug. 21, 1892, Assiniboin. NORTH DAKOTA—4 ♂, taken with types. 4 ♂ 4 ♀ July 19, 1920, Devil's Lake. ♂ July 30, ♂ Aug. 4, 1920, Turtle Mountains (T. H. Hubbel). ♂ ♀ July 29, 1921, Edgeley. SOUTH DAKOTA—♂ ♀ June 16, 1891, Brookings (H. C. Severin). WYOMING—3 ♂, 2 ♀ July 20-25, 1920, Yellowstone National Park (A. A. Nichol). CANADA: BRITISH COLUMBIA—♂ June 9, 1905, Vernon. ♀ Aug. 15, 1919, Fort Fraser (W. B. Anderson). MANITOBA—♂, Winnipeg (A. W. Mitchener). ♀ July 22, 1910, Winnipeg (J. Cocks). SASKATCHEWAN—♂ ♀ July, 1922, Saskatoon (A. E. Cameron); reported as injurious to "small fruits."

Lopidea falcicula new species (Plate II, Fig. 6)

♂. Length 6.5 mm., width 2.3 mm. *Head*: width 1.11 mm., vertex .65 mm. *Antennae*: segment I, length .63 mm; II, 2.2 mm., cylindrical; III, 1.61 mm.; IV, .46 mm. *Pronotum*: width at base 1.8 mm. Color suggestive of *dakota* but the calli, scutellum and hemelytra with deeper black, and the pubescence on the dorsum finer and less conspicuous; genital claspers (fig. 6) distinctive.

♀. Length 6.8 mm., width 2.4 mm.; very similar to the male in form and coloration.

Holotype: ♂ August 2, 1900, Rico, Colorado (E. D. Ball); author's collection. *Allotype*: same data as type. *Paratypes*: ♂, topotypic. ♀ August 5, 1900, Antonio, Colorado.

Lopidea fuscina new species (Plate II, Fig. 5).

♂. Length 6.2 mm., width 2.14 mm. *Head:* width 1.22 mm., vertex .40 mm. *Antennae*: segment I, length .67 mm.; II, 2.16 mm., nearly cylindrical but perceptibly more slender near apex. *Pronotum:* width at base 1.86 mm. Form and color suggestive of *falcicula* but red areas of dorsum bearing yellowish pubescence; genital claspers (fig. 5) distinctive.

Holotype: ♂ June 6-8, 1907, Mount Diablo Range, Fresno County, California (J. C. Bradley); Cornell University collection.

Lopidea taurula new species (Plate II, Fig. 8).

♂. Length 5.9 mm., width 2 mm. *Head*: width 1.14 mm., vertex .68 mm. Genital claspers (fig. 8) indicate a close relationship with *taurina* but in this case the prongs of the right clasper scarcely form a half circle; dorsum clothed with short, black pubescent hairs, also more broadly red than in *taurina*.

Holotype: ♂ June 24, 1882, Umatilla, Oregon; author's collection.

Lopidea nigridea Uhler, Hemiptera Colorado, p. 30, 1895.

Distinguished by the genital claspers (Plate II, fig. 9), also by the chiefly fuscous coloration and the short, erect black hairs of the dorsum. The figure of the genital claspers here presented was drawn from one of the co-types (♂ July 16, 1894, Steamboat Springs, Colorado, C. F. Baker).

Lopidea fallax new species (Plate II, Fig. 10).

♂. Length 6 mm., width 2 mm. *Head*: width 1.14 mm., vertex .40 mm. *Antennae*: segment I, length .54 mm.; II, 1.97 mm., cylindrical. *Pronotum*: width at base 1.66 mm. Genital claspers (fig. 10) distinctive, although showing a close relationship with *nigridea;* differs from *nigridea* in the soft fine pubescence, nearly black hemelytra with reddish margins and the deep rose red pronotum with black calli.

Holotype: ♂ June 11, 1915, below Mountain Springs, San Diego County, California (Harold Morrison); author's collection. *Paratypes:* 2♂, taken with type. 3♂ June 11, 1915, Jacumba to Campo, San Diego County (Harold Morrison), and ♂ ♀, Los Angeles County, California.

Lopidea serica new species (Plate II, Fig. 12).

♂. Length 5.8 mm., width 2.24 mm. *Head*: width 1.23 mm., vertex .71 mm. *Antennae*: segment I, length .60 mm.; II, 2 mm., cylindrical; III, 1.16 mm.; IV, .46 mm. *Pronotum*: width at base 1.9 mm. Genital claspers (fig. 12) indicate a close relationship with *nigridea*, but *serica* differs in that the hemelytra bear in addition to black hairs, closely appressed, yellowish sericeous pubescence; hemelytra red, only slightly infuscated at commissure, scutellum nearly black, disk of calli with black spots.

♀. Length 5.7 mm., width 2.3 mm.; very similar to the male in form and coloration.

Holotype: ♂ June 28, 1900, Fort Collins (E. D. Ball); author's collection. *Allotype*: taken with type. *Paratypes*: 2♂, topotypic.

Lopidea yakima new species (Plate II, Fig. 11).

♂. Length 5.1 mm., width 2 mm. Closely related to *aculeata* but evidently differs in structure and color of the genital claspers (fig. 11). Dorsum bright red, calli and scutellum black, dorsum clothed with short black hairs and intermixed, at least on clavus, with closely appressed, sericeous yellowish pubescence.

Holotype: ♂ August, 1893, Olympia, Washington (Kinkaid); author's collection. Named after the Yakima Indians.

Lopidea mohave new species (Plate II, Fig. 14).

♂. Length 5.7 mm., width 2 mm. Related to *marginata* but differs in the genital claspers (fig. 14). Dorsum fusco-reddish, pronotum more fuscous than reddish, cuneus bright red; calli with margins black and spots on disk of each.

Holotype: ♂ July 25, 1907, San Antonio Canyon, Ontario, California; author's collection. Named after the Mohave Indians.

Lopidea nicholi new species (Plate II, Fig. 4).

♂. Length 5.8 mm., width 2 mm. *Head*: width 1.14 mm., vertex .64 mm. *Antennae*: segment I, length .60 mm.; II, mutilated. *Pronotum*: width at base 1.52 mm. Dorsum yellow as in *robiniae* but scutellum and each side of commissure not so distinctly black; dorsum clothed with short stiff, suberect black hair. Genital claspers (fig. 4) distinctive of the species.

Holotype: ♂ August 7, 1920, Columbia County, Washington (A. A. Nichol); author's collection.

Lopidea ute new species (Plate II, Fig. 19).

♂. Length 5.7 mm., width 1.7 mm. *Head*: width 1.14 mm., vertex .61 mm. *Antennae*: segment I, length .48 mm.; II, 1.86 mm., cylindrical; III, 1.26 mm. *Pronotum*: width at base 1.6 mm. Coloration suggestive of *navajo;* dorsum dark fusco-reddish, anterior margin of pronotum, embolium and outer margin of cuneus pale; clothed with very fine yellowish pubescence; genital claspers (fig. 19) distinctive of the species.

Holotype: ♂ July 15, 1894, Steamboat Springs, Colorado (C. F. Baker); Cornell University collection. *Paratypes*: 2♂, "Colo. 1330, 1341." Named after the Ute Indians, a tribe that inhabited the mountains of Colorado.

Lopidea teton new species (Plate II, Fig. 13).

♂. Length 6.3 mm., width 2.43 mm. *Head*: width 1.2 mm., vertex .68 mm. *Antennae*: segment 1, length .71 mm.; II, 2.1 mm., nearly cylindrical, although perceptibly tapering smaller on apical half; III, 1.54 mm.; IV, .47 mm. *Pronotum*: length 1.26 mm., width at base 2.01 mm. Pubescence and color nearly as in *dakota* but the red coloration tinged with rose, disk of pronotum distinctly rose colored. Genital claspers (fig. 13) distinctive.

♀. Length 6.1 mm., width 2.36 mm.; very similar to the male in form and coloration. *Antennae*: segment II, length 1.86 mm. *Pronotum*: length 1.2 mm., width at base 2 mm.

Holotype: ♂ June 16, 1920, Norman County, Minnesota (A. A. Nichol); author's collection. *Allotype*: ♂ July 12, 1920, Cass County, North Dakota (A. A. Nichol). *Paratypes*: COLORADO—♂ ♀ June 6, ♀ July 17, 1900, Fort Collins (E. D. Ball); ♀ June 13, 1915, Morrison (E. C. Jackson). KANSAS —♂ May 29, Riley County; 2 ♀ May 30, Topeka (Popenoe). MINNESOTA—♀, Ottertail County (O. W. Oestlund); ♀ June 20, 1922, Norman County (A. A. Nichol), MONTANA—♂ June 18, 1911, Gallatin Valley. NEVADA—♂ April 20, 1915, alt. 6300 ft. Round Mountain (E. G. Holt). NORTH DAKOTA—♀, Dickenson (H. Osborn). SOUTH DAKOTA—2 ♀ June 16, ♂ June 21, Brookings; 2 ♂ 2 ♀ June 1, 1921, Capa (H. C. Severin). TEXAS—♀ April, 1914, Fort Worth (W. S. Adkins). Named after the Teton Indians, a name signifying "dwellers of the prairies."

Lopidea bullata new species (Plate II, Fig. 16).

♂. Length 4.6 mm., width 1.7 mm. *Head:* width 1.30 mm., vertex .80 mm. *Antennae*: segment I, length .34 mm.; II, 1.18 mm., slender, cylindrical; III, .86 mm.; IV, .37 mm. *Pronotum*: length .91 mm., width at base 1.51 mm. Closely related to *puella* but surface clothed only with soft yellowish pubescence, also the right clasper (fig. 16) without an erect, acute spine at dorsal angle, nor is the distal portion longitudinally furrowed. Pale to fuscous, head large, anterior margin of pronotum, scutellum, embolium and cuneus pale to white; membrane pale, veins and a ray behind smaller areole fuscous.

♀. Length 4.3 mm., width 2 mm.; embolar margins strongly arcuate; coloration similar to the male; membrane abbreviated, just attaining tip of abdomen.

Holotype: ♂, Los Angeles County, California; Cornell University collection. *Allotype*: same data as type. *Paratypes*: ♂ ♀, topotypic.

Lopidea bullata fusca new variety.

Genital claspers not differing appreciably from the typical species but with membrane and veins uniformly infuscated; scutellum and paler parts of head and pronotum reddish.

Holotype: ♂, Los Angeles County, California; Cornell University collection.

Lopidea wileyi new species (Plate II, Fig 17).

♂. Length 4.6 mm., width 1.6 mm. *Head*: width 1 mm., vertex .60 mm. *Antennae*: segment I, length .43 mm.; II, 1.5 mm., cylindrical;

III, .91 mm. *Pronotum:* width at base 1.36 mm. Black, hemelytra with a reddish tinge, pronotum red, calli blackish; clothed with fine short blackish pubescence; genital claspers (fig. 17) very distinctive of the species.

♀. Length 4.6 mm., width 1.6 mm.; very similar to the male in form and coloration.

Holotype: ♂ April 20, 1921, Eastland County, Texas (Grace O. Wiley); author's collection. *Allotype*: same data as the type. *Paratypes*: 2 ♂ 7 ♀, taken with the types. ♀ April 24, ♂ May 2, San Diego, Texas.

Lopidea falcata new species (Plate II, Fig. 18).

♂. Length 5.4 mm., width 2 mm. *Head:* width 1.14 mm., vertex .63 mm. *Antennae*: segment I, length .57 mm.; II, 2 mm., nearly cylindrical but tapering to slightly more slender apically. Black, lateral margins of pronotal disk behind calli, cuneus, embolium, base of clavus and outer half of corium red; dorsum clothed with fine yellowish pubescence; genital claspers (fig. 18) very distinctive of the species.

♀. Length 6.3 mm., width 2.2 mm.; larger than the male but very similar in form and coloration.

Holotype: ♂ July 12, 1915, Jemez Springs, New Mexico (J. Woodgate); author's collection. *Allotype*: same data as type. *Paratypes*: 2 ♂ 3 ♀, topotypic.

EXPLANATION OF PLATE II.

Male genital claspers of *Lopidea*

a, left clasper, dorsal aspect.
b, right clasper, dorsal aspect.
c, right clasper, posterior aspect.
d, left clasper, posterior aspect.
e, right clasper, internal lateral aspect.
f, right clasper, lateral aspect.

The Mulford Biological Exploration of the Amazon Basin.

Two accounts of some of the experiences of this expedition (on which some notes were published in the NEWS for 1922) have recently appeared. One is by the Director, Dr. H. H. Rusby: Report of Work on the Mulford Biological Exploration of 1921-22 (Journal, N. York Botan. Gard., xxiii, pp. 101-112), the other by Dr. O. E. White: Botanical Exploration in Bolivia (Brooklyn Botan. Garden Record, xi, pp. 931 et seq.)

Notes on the Biology of Two Species of Stenopelmatus (Orth.: Tettigoniidae).

By Carl D. Duncan, Stanford University, California.

Very little is known concerning the lives of these singular insects, references in consequence being few and generally vague, most authors having dismissed the subject with a statement to the effect that *Stenopelmatus* is supposed to feed on decaying or dead animal or vegetable matter. On the other hand, Essig[1], says, "However, we do know that they are often responsible for considerable injury to potatoes before they are dug. The tubers are gnawed so as to be unfit for keeping or selling. Occasionally a large proportion of the crop may thus be injured but this is more likely to occur in small newly cleared areas." The following observations therefore, though made on insects in the laboratory, and not at all extensive, have the value of definiteness, which may justify their publication.

Stenopelmatus longispina Brunner.

On March 5, 1921, a large female was collected from under a stone near Cooley's Landing on San Francisco Bay, near Palo Alto, and brought into the laboratory. Here it was put into a small wire screen cage with about an inch of damp sand in the bottom. A card-board box cover, open at one end, was placed on the sand to give shelter to the insect should it choose to remain above ground.

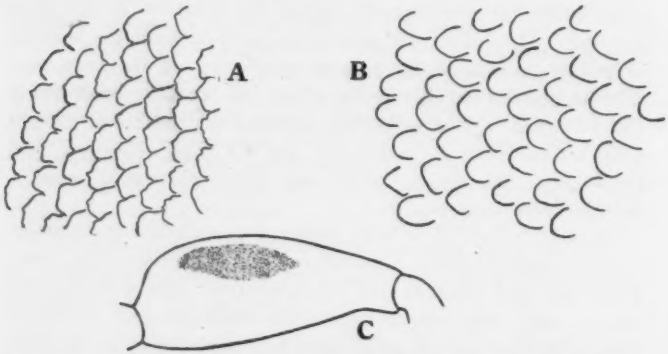
The specimen was kept from March 5 to March 24. On the latter date it was found dead, the cause of death not being apparent. Dissection showed the specimen to be a fully adult female, the abdomen containing twelve apparently fully formed eggs and many others in various stages of development. The mature eggs were of a regularly elliptic form, measuring two mm. by four mm., and were of a lemon-yellow color.

The insect burrowed into the sand during the day, where it remained quiet unless disturbed. At night it came out and crawled actively about the cage climbing all over the sides. When the sand became dry through neglect, or very wet when too much water was put in, *Stenopelmatus* stayed above ground and used the card-board shelter.

[1] Essig, E. O. Injurious and Beneficial Insects of California, p. 37-8.

For several days I kept a petri dish of water in the cage, but I failed to observe the captive drink, although I frequently watched it at night at varying hours up to 2.30 A. M.

About thirty-six hours after having collected the specimen, it having passed the intervening time in a small bottle, I placed it on a laboratory table and began teasing it with a pair of forceps. It exhibited the usual defensive and belligerent attitudes characteristic of the genus and in addition, to my surprise, began stridulating. The sound produced was quite similar to



Stenopelmatus longispina Brunner: A, portion of rasp of male; B, portion of rasp of female; C, inner surface of hind femur of male, showing stridulatory rasp.

that made by rubbing two pieces of rough paper together and was made by rubbing an elongated, roughened area on the upper edge of the inner surface of the hind femur (Fig. C) against the short spines which are scattered over the sclerites and connectiva of the side of the abdomen. An examination of several specimens in the University collection showed both sexes to possess the stridulating apparatus.

The mechanics of the stridulation vary. When first noted the insect pressed the femora against the sides of the abdomen and the latter was then jerked upward and slightly forward from one to several times. Later on the insect stridulated when walking away from me and at such times the legs furnished practically all the movement. Stridulation is not

naturally incident to walking, however, as the insect at times walked quite noiselessly. Again, quoting from my notes, "When touched on its back or cerci it kicks one or both of its hind legs high in the air over its back, rubbing its femora against the abdomen in doing so."

The function of the stridulation, as indicated by this specimen, seems to be defensive and intimidatory. For example, "I drop an angleworm in front of 'Steno.' At the squirming of the worm 'Steno' draws back quickly and stridulates twice. I put two *Batrachoseps* (a small salamander) into the cage, dropping one alongside 'Steno,' who promptly stridulated. She stridulated again when I pecked the sand behind and slightly to one side of her with my forceps."

The only food that I succeeded in getting the insect to eat was animal. It refused to eat bits of apple or potato or the berries of *Eugenia* sp., even when not supplied with any other food for two or three days. It ate a number of freshly killed Cerambycid larvae and several large termites which were placed in the cage in a petri dish. So far as observed it fed only at night. When feeding, the click of its mandibles was audible for at least four feet from the cage. An angle-worm which I put alive into the cage was apparently eaten for it disappeared. However, the angle-worm may have escaped from the cage through a hole in one corner, although this seems impossible as the hole was fully one and one-half inches above the sand and it seems unlikely that an angle-worm would forsake an attractive home of wet sand to crawl about a dry metal cage.

A small salamander, *Batrachoseps attenuatus*, about four and a half inches long, which I put into the cage, and which burrowed immediately into the sand, disappeared during the course of four days. I later found what appeared to be the tail of the salamander in the cage. However, I should not like to say that the *Stenopelmatus* killed and ate the salamander as it could easily have climbed out of the cage through the hole mentioned before. Nevertheless, the belligerence and strength of the *Stenopelmatus* which would make the *Batrachoseps* an easy prey should it be chosen for such a fate at

least makes it seem not impossible that the salamander met its death at the "hands" of the former.

Decaying animal matter, such as Cerambycid larvae, crickets, crane fly larvae and two dead ring-necked snakes were untouched by the *Stenopelmatus* although they were left in the cage for several days. No food of any sort was eaten during the four days preceding the insect's death.

Stenopelmatus pictus Scudder.

On October 22, 1921, a male of this species was found near Stanford University under a pile of garbage which had been exposed to the weather for several months and was nearly dried out. It bore the empty shells of thirty-eight elliptic, white eggs of a Dipterous parasite, of which seven were on the legs, five on the thorax and twenty-six on the abdomen. The *Stenopelmatus* did not seem to be in the least incommoded by the eggs or the larvae which had hatched from them and were even then living within its body.

I kept the specimen in a large jar, without any sand or earth. It received no food until October 27, when at 7.30 P. M., I put in a small grass-hopper, *Melanoplus* sp., of which I pinched the head and removed the hind legs in order to render it less lively. At 8.10 P. M., the *Stenopelmatus* began feeding on the grass-hopper and continued to do so until only the detached hind legs, a few eggs that I had squeezed out of it in killing it, and a piece of the pronotum remained. The chitinous parts were chewed and swallowed along with the rest. The click of the *Stenopelmatus'* mandibles was distinctly audible as it fed.

After feeding ceased I began teasing the insect. Continued teasing for several minutes failed to elicit stridulation. An examination of the specimen, however, revealed the same stridulatory mechanism as that possessed by *S. longispina*. I repeatedly turned it on its back with my forceps or caught and held it by one leg. In answer to the former it usually merely righted itself and tried running away again. To all appearances it ran in any direction which proved convenient, as frequently toward my threatening forceps as away from them. When held by one leg it turned and used its other legs

and its mandibles in attempts to free itself. When picked up by the thorax it would use all six legs in an attempt to get free. After considerable teasing it lost its good nature and began to show resentment, running away less. When approached by the forceps it would rear up its body in a defensive attitude, lifting its middle and fore legs on the side next the forceps. It would defend itself with great vigor, biting and scraping the forceps. No stridulation whatever took place.

On October 28 I placed a cricket in the jar. The *Stenopelmatus* followed it about, making several unsuccessful attempts to capture it. From what happened it was not apparent whether the *Stenopelmatus* were actually hostile or merely manifesting curiosity. Both insects shortly became quiet on opposite sides of the jar and remained so until 12.30 P. M. of the next day, at which time I put in a grass-hopper, *Melanoplus* sp. The grass-hopper jumped about excitedly, much to the discomfort of the *Stenopelmatus* and the cricket. After several attempts the former caught the grass-hopper and chewed a big hole in the venter of its thorax. Then it left the grass-hopper practically dead and with legs twitching.

At 8 P. M. the hole in the grass-hopper's thorax was much larger. I put in a live fly, *Calliphora erythrocephala*.

On October 30 at 2.30 P. M. the cricket was dead and the fly apparently killed and eaten, since it had disappeared.

On October 31 the *Stenopelmatus* killed but did not eat another *Calliphora*. A third was left unmolested.

On November 3 the *Stenopelmatus* died.

On November 7, A. M., parasitic larvae began to emerge. They all emerged within twenty-four hours, making their exit from the host through a slit in the dorsum of the abdomen between segments two and three. In all seventeen larvae emerged. They showed considerable variation in size.

A few days later the mature flies emerged. These were determined by Mr. F. R. Cole as *Plagioprospherysa parvipalpis* Van der Wulp.

The species of *Stenopelmatus* were determined by the author with the aid of Hebard's paper on the genus[2].

[2] Hebard, M. Jn. N. Y. Ent. Soc. 24: 70-86. 1916.

Observations on the Behavior of Spiders; the Safety of Spiders from becoming Entangled in their own Webs (Aran.).

By RICHARD M. BRICKNER, College of Physicians and Surgeons, New York City.

It was the belief of Fabre[1], substantiated by a single set of experiments, that the spider secreted some sort of fatty fluid, soluble in carbon disulphide, which protected the legs of the animal from becoming stuck to the sticky parts of its web.

The following observations were carried out on the basis of this view. Large orb spiders, strong and very vigorous, were held by one leg, while several of their other legs were bathed in carbon disulphide. Opportunity was given for the surplus carbon disulphide to evaporate, and the spiders were then dropped on to the floor of large funnel or orb webs. In making its first attempt to walk the spider became completely entangled. A series of controls was run simultaneously, and the following results were obtained in every case: Controls: normal spiders were able to move about with ease in any web in which they were placed. Experiments: spiders whose legs had been bathed with carbon disulphide were unable to manouvre properly in any web, because their legs became adherent to the silky strands. Technique: the animal was held in the left hand, by six or seven legs. The remaining leg or legs were allowed to lie upon the tips of the fingers. Carbon disulphide was allowed to drop from a pipette, upon these free legs. In most cases the remaining legs were freed, one by one, and similarly bathed. The legs were allowed to become perfectly dry. Care had to be exercised not to touch any portion of the animal's body with carbon disulphide except the legs; otherwise instant death followed.

The fact being that a bath of carbon disulphide causes the legs of the animal to stick to the silk of a web, the following possibilities obtain in explanation: 1. The globules of carbon disulphide themselves serve as a glue. 2. The carbon disulphide causes paralysis of the leg muscles. 3. There is a pro-

[1]Life of the Spider, page 274.

tective fluid, which is dissolved away by the carbon disulphide (Fabre's hypothesis). 4. The dust, etc., upon the leg becomes condensed among the setae.

Possibility No. 1 is disposed of at once, because the leg was always allowed to become perfectly dry before the experiment proper was commenced, and there was not the least possibility of any of the very volatile bathing fluids remaining upon the animal's limb. The possibility of paralysis is raised by the following facts: in every case in which merely the two forelegs had been wet with carbon disulphide, the spider, in quitting the floor of the strange web, kept these wet legs raised aloft, and would not allow them to touch the silk at all. This was observed even with hind legs which had been bathed alone. In some instances the bathed legs were dragged after the spider, behind, motionless and more or less stiffly. This peculiar attitude may have been due to paralysis, or simply to an effort at protection, on the part of the subject. That the former contention is incorrect is definitely proved by the vigorous motion of all the subjects, after removal from the trap web, and particularly by the following instance: The bathed subject was placed on the floor of a tunnel web. Instead of essaying to escape it stretched itself out at full length, with legs extended and lying together, four toward the head and four toward the tail—as the same variety of spider frequently does in its own web, or under a leaf, in the presence of large enemies, like a human hand. No amount of poking would make this animal budge. Thinking it possible that it might be dead, I picked it up in my hand. In a few seconds the limp spider suddenly sprang to its feet and rushed away. This specimen repeated its performance twice, but finally attempted to walk off the delicate floor of its own web, in which I had subsequently placed it, and succeeded only in shattering the structure, and in carrying a good deal of the substance off on its feet.

The hypothesis of Fabre, that the sticking is due to the solution of some organic, secreted protective fluid, has no direct proof. It is rather a broad jump to assume that the particular fluid which the spider is supposed to secrete happens to be soluble in carbon disulphide.

The damage done to the spider's leg is temporary, and seems to be repaired by a process of combing, which the animal performs after its bath, and which is described in the following paragraph.

It is possible and even necessary to assume, with the protective fluid theory, that this act, which invariably restores to the spider its facility and without which the facility does not seem to return, replenishes the supply of fluid to the legs from which it has been dissolved. While there is no proof that this does not occur, repeated observations of the process under the binocular have failed to exhibit the presence of any droplets, such as might be expected, upon the freshly combed legs, and the following observation furnished conclusive proof that the operation accomplishes (perhaps among other things) a cleansing of the combed leg. I observed a single combing, which went on in the palm of my hand, with a lens. First the legs were carefully drawn between the chelicerae, several times. The pedipalpi were then inserted between the chelicerae and were used as brushes. The pedipalpi were soon withdrawn from the chelicerae, covered with dirt, which they had evidently brushed from the latter. The spider now rubbed its pedipalpi together and rolled up a little pill of dirt which it discarded. This fascinating act was repeated.

Inasmuch as it is an easily perceived fact that the dust, etc., on the spider's leg, is quite condensed among the setae, and that the setae themselves are matted down, and more or less adherent to the shaft of the leg, after the carbon disulphide bath, it is very probable that this matting and condensing are the factors which do away with the free play of such a leg. In fact, it seems rather far-fetched and unnecessary to seek any further for an explanation.

The following further observation is the only positive indication against the fluid theory. The body of a spider which had been dead about 43 hours was examined, and found to be so dry that the legs had to be handled with care to prevent their breaking off. It is a fair assumption that no film of protective fluid could have been left on the legs or body of this animal, and

yet the legs showed as great an immunity as ever, when touched to, or rubbed against, a sticky thread.

We now have a method of causing the temporary loss of the animal's immunity. Wherein, then, lies the actual facility of the normal animal? If we do not seek some fluid as the source of it, another protective agency must be found, and the first place to look for it is in the structure of the animal's body itself.

The following experiments, repeated a number of times, furnished final proof that no part of the body of a spider will adhere tightly to a web, if merely placed in contact with some sticky part of it. A medium-sized zigzag spider was chosen. The common observation of the journey of the animal across the sticky areas of its web was made and it was found that the glue upon the strands offered no impediment whatsoever. Firm grasp of a leg was taken, and the structure was rubbed vertically along a strand. Very slight sticking occurred. Rubbing of the leg horizontally along the strand was thereupon performed, and the same immunity was observed. This experiment was repeated with numerous specimens with unchanging results. The abdomen of the spider was then held against sticky threads in every conceivable position. Again, only very slight adherence occurred. The tip of the abdomen was introduced between three parallel and consecutive sticky threads. When the body was drawn away from the web, the three threads followed it a little way, but they were invariably released and sprang back to their original positions. All parts of the abdomen were thus found to be equally non-adhesive, under a control series. When the same manouvre was attempted with a blade of grass, and with a small straw, the threads were never able to spring back to their original parallelism, because of an attachment formed with the instrument. In all cases, the three threads were pulled much farther out from their supporting radii than had been the case when the various parts of the spider's body had been the pulling apparatus. In every instance, in the control set, at least one thread broke.

Referring again to the dried body of the spider which had

been dead 43 hours, it should be mentioned that the abdomen, as well as the legs showed normal immunity.

The legs and bodies of some demoiselles, and of several other smooth-winged insects, were now tried; and, surprisingly enough, were found to be as slightly adherent as the similar parts of the spider. The legs of a grasshopper were drawn across the sticky strings like the bow of a violin; its passage was entirely unimpeded. If the body of the spider contains no safeguard which is greater than that of the insects which it makes its prey, why is the home in which the spider lives in ease and comfort a death trap for flies and grasshoppers?

It is possible that the spider is possessed of an instinct which enables it to take care of itself in a web, whereas the insects which are unfortunate enough to tumble into a spider's web are not so blessed, and soon find themselves lost. The obvious hypothesis is that it is the entanglement in which the ordinary insect involves itself which causes that animal to be completely entrapped, and hopelessly entangled in the end.

It might be surmised then that even a spider, thrown violently into a web, might find itself in difficulties. Such is exactly the case. A large zigzag spider was selected and was pitched, with some violence, into a web of a larger specimen. It struggled and soon became completely entangled. The spider had sufficient strength so that a thread lying across its back caused it no trouble, but it did not have strength enough to pull any one leg out of its silk sheath, until all the others were free, except with the most extreme difficulty. I, however, was able to draw any leg out of its wrapping with ease; the silk peeled off. The observation was repeated a number of times. The spider was found to possess no particular facility except when in the standing position. When thrown into a web the first effort was always to achieve the standing position, and to present the least possible body surface to the sticky strands. This is accomplished, of course, by resting on the individual strands upon the claws, and by clutching the strands with these claws. It will be observed that this position is the one used by the spider when it is traveling across the sticky part of its web; as well as when it is resting in the central, non-sticky portion of it, and also

that the spider actually handles the sticky lime silk, when the web is being built, by clutching it between its claws.

It would seem that darning needles, grasshoppers, etc., which are accustomed to being caught and involved, when they strike webs, could save themselves, if they eliminated their wild struggles, and, instead of slapping at the trap with their wings, should fold up the latter and devote themselves to aping the spider by acquiring the position of standing quietly upon their points of least body surface, namely, their feet.

A damsel fly's wings were cut off short; the fly had no trouble at all in dropping out of the web, provided only that it was placed there on its feet. Occasionally the long abdomen became entangled and had to be freed by hand. In freeing itself, the clipped damsel fly did not drop off of the web at once, but clung to it with her claws. Upon my attempting to liberate her from her entanglement, the shackles slid off easily enough, but the animal subsequently clung to them with her own claws. Repeated observations of this character were convincing that the bewilderment and lack of the proper instinct, as well as the massive bodily projections, such as wings, or long abdomens which singly were not very adhesive, but which, together, could become very much entangled, are what contribute most largely to the fatal entanglement of most of a spider's prey; and that the particular factor which bestows upon the tenant of the web its own dexterity in getting about, is a body which is so constructed that the animal is not burdened by ponderous projecting parts; and, second, an instinct by which the spider remains in, or immediately achieves, the standing position when in, or placed in, a web.

It must not be forgotten that a spider builds a web for its own individual use, and that it cannot help placing the succeeding strands just so far apart from each other that the distance is best fitted to be covered by legs which are of the exact size of those possessed by that particular spider. The grasshopper which strikes the web is not built for such a home; its comparatively massive body occupies too much space, covers too many sticky threads. One or two moves, and the grasshopper has wrapped itself in a fatal sheath. The poor ant which finds

itself upon a web is usually in an equally embarrassing position. Even if it were possessed of the spider's instinct, it could not reach; it is too small, one strand is often all it can touch, and it can do little but haul its poor body slowly along that sticky strand.

Regarding the generic and specific names of the spiders, I am, unfortunately, not able to be as precise as I desire to be. The spiders were not identified properly at the time the experiments were done, because of the interference of certain circumstances, and the saved specimens were lost. I have spent considerable time in examining the spider collection at the Museum of Natural History; this work leads to the probable identification of the "orb" spider I used as *Tetragantha extensa*, and of the "zigzag" spider as *Miranda aurantia*. The fallibility of this second-hand method of identification, however, makes it impossible to be certain of the results.

A New Species of Agrilus (Buprestidae, Col.).

By A. B. Champlain and J. N. Knull, Bureau of Plant Industry, Harrisburg, Pennsylvania.

A collection of *Agrilus* belonging to the University of Minnesota was submitted to the authors for determination, through Prof. J. G. Sanders, Director of the Pennsylvania Bureau of Plant Industry. In identifying the material one species was found which did not agree with any of the described members of the genus, and though the kindness of Prof. H. H. Knight, the authors were permitted to describe it.

Agrilus egeniformis n. sp.

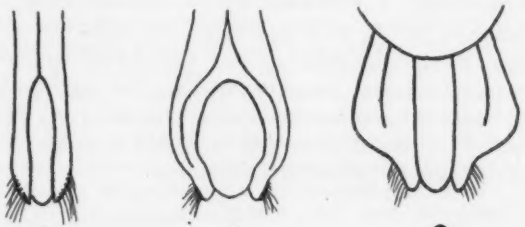
Olive bronze, more shining below than above. Antennae reaching the hind angles of the prothorax in the male, serrate from the fifth joint. Vertex of head with a feeble median impression. Prothorax wider than long, sides arcuate, hind angles rectangular with an oblique carina, lateral margin defiexed in front, disk convex with two rather shallow median impressions, lateral oblique depression prominent, surface lightly transversely strigose. Scutellum transversely carinate, surface granular. Elytra with sides sinuate near base, dilate behind middle, apices rounded and serrulate, surface imbricate, each elytron with three pubescent spots, one at base, one in front of middle and one back

of middle. Prosternal lobe truncate, slightly emarginate. Abdomen sparsely punctate, pygidium carinate, carina not prolonged, tarsal claws broadly toothed at base. Length 4.5 mm.

♂.—Front more shining. A dense line of pubescence extending from prosternum to end of second ventral segment. First and second ventral segments of the abdomen impressed at middle.

♀.—Prosternum not pubescent, ventral segments of the abdomen not impressed at middle.

Superficially this species resembles *A. fallax* Say, but can readily be separated from this species by the serrate fifth antennal joint. According to Horn's key this species would run to *A. egenus* Gory, but it is distinct from this species and *A. celti* Knull by the marked pubescent patches of the elytra and by the structure of the male genitalia.



Outline drawings of the male genitalia of the following species of *Agrilus*: 1. *A. celti* Knull; 2. *A. egenus* Gory; 3. *A. egeniformis* n. sp.

Although the adults of *A. egenus* Gory, *A. celti* Knull and *A. egeniformis* n. sp. approach each other in general appearance, the genitalia of the males show striking differences which are best shown by the accompanying outline drawings.

Described from a series labeled "Mo." in the collection of the University of Minnesota, and from one specimen labeled "Lawton, Oklahoma," collected by G. W. Barber, and two specimens labeled "West Pt., Nebraska, June," in the collection of C. A. Frost. The authors are indebted to Mr. Frost for the loan of his material. *Type* labeled "Mo." in the authors' collection.

*G. H. Horn—Trans. Amer. Ent. Soc., Vol. 18, p. 277-336, 1891.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MARCH, 1923.

A Possible Service to Entomologists.

It has been suggested that the NEWS might do a service to working entomologists, especially those who have not access to large libraries or to the rarer entomological books and papers, by occasionally reprinting brief articles which never enjoyed a large circulation. Such are some of the specific descriptions of Thomas Say, S. S. Haldeman and others. Perhaps to reproduce these in the NEWS would be a real help to students. Under present costs of publication, the NEWS could not increase its pagination to include such reprintings, nor would it be fair to greatly delay the appearance of new work by taking more than a few pages per year for this purpose. We shall be glad to receive expressions of opinion on this proposal from our readers, as well as the titles of papers desirable to be reprinted, should this idea be carried into execution.

Oxycnemus histrina on Fungus (Col.: Nitidulidae).

Mr. Charles Leng has advised me to publish a record capture of a beetle found on the mushroom (*Phallus impudicus*-Stink Horn Fungus) which I collected at Mulhall Station, Virginia (near Washington) on September 23. I wrote to Mr. Leng after consulting Dr. E. A. Schwarz and Mr. Barbour of the National Museum in regard to the advisability of recording this capture and the three seem to agree that it is quite unusual. The beetle in question is the Nitidulid beetle—*Oxycnemus histrina*. In collecting this beetle, I came across one single mushroom and found it in a very decayed state. In the mushroom itself, or better yet in the partial remains of the mushroom, I took the astounding number of 38 specimens and had I wished to exterminate the colony, very likely could have taken at least 75-100 more. All three of the gentlemen whom I consulted agreed that this is by far a record. Dr. Schwarz had never captured more than 3 on a single plant and Leng had taken but 5 and both agreed that in most cases not more than one specimen was to be found on a single plant. Blatchley says in his "Coleoptera Known to Occur in Indiana" that only one or two specimens have ever been found on a single plant.

I should be pleased to hear further from collectors on this question. It may be that I am mistaken in calling my case a record one.

MORTIMER L. J. HIGGINS, 1303 P St. Northwest, Washington, D. G.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

A Supplementary Note on Gomphus dilatatus (Odon.: Aeshnidae).

Mr. Philip Laurent, to whom I owe so much interesting Odonate material, has given me a male *Gomphus dilatatus* Rambur, taken by himself at Gunntown, Levy County, Florida, March 1-15, 1922. Its capture was, consequently, subsequent to the publication of my recent paper[1] on this species and its allies. This male is the seventh of its sex known to me.[2] A comparison of it with such of my previous material as is now available, viz.: the male from Suwanee Springs (?), Florida, from which figs. 14, 15, 17 and 21 of my Plate XV were drawn and the fragments from Amite River, Louisiana, shows some interesting facts. When I drew my figure 21, I believed, from comparisons with *lineatifrons* and *vastus*, that the terminal filaments of the penis of *dilatatus* were in reality as long as they are represented in my figures 22 and 23 for *lineatifrons* and *vastus* respectively, and I therefore indicated them as broken, showing a part of their supposed length by dotted lines. On relaxing the new Gunntown male, I carefully extruded the penis, experiencing no difficulty in the operation, and then found that it and the Suwanee (?) and the Amite River males agree in possessing *short* terminal filaments to the penis. Their actual length would be expressed by retaining only the first two pairs of dots for each filament in my figure 21 and expunging the others. Each filament in all three males terminates in a very acute point, very much more slender than the filaments of *lineatifrons* and *vastus* at the same distance from their bases.

This difference in the length of these filaments will thus constitute another structural character in the male of *dilatatus vs. lineatifrons* and *vastus*.

I also note that the Gunntown male has the tooth of the second penis joint (*tp* of my figure 23) not as attenuate as apex, nor with the slight ante-apical process, as shown in my figure 21, but is more as in figure 22. The same statements are probably true for the Amite River male although this tooth has been damaged.

The posterior margin of the vesicle of the penis, fully extended, of the Gunntown male, measures 1.406 mm., which is .345 of the height of the hind margin of abdominal segment 2. Corresponding figures for a second male (paratype) of *G. lineatifrons* from the Tippecanoe River, Indiana, are 1.48 mm. and .4 (*cf.* character 18, Trans. cited, p. 224).

[1]Trans. Amer. Ent. Soc. xlvii, pp. 221-232, pls. xiv,xv. Dec. 27, 1921.

[2]In addition to the five mentioned in my paper, *l. c.*, pp. 225, 230, I believe that there is still another in Mrs. A. T. Slosson's collection.

Mr. Herbert Campion, of the British Museum of Natural History, wrote me under date of August 21, 1922: "I have examined John Abbot's coloured drawing (No. 14)[2] of *Gomphus dilatatus* with your remarks on the species before me As regards the coloration of abdominal segment 8, which is the subject of comment in your paper, there is no indication of any middorsal line, but there is an anterolateral yellow spot on each side, which, on the right side, at all events, is continued backwards as a rather broad band to the posterior margin of the segment. Segments 7 and 9 also have lateral yellow markings. The thoracic pattern agrees very well with your fig. 13, except that posteriorly, the junction between 1*a* and 2*a* is rounded, and not straight, as shown by you."

PHILIP P. CALVERT.

Leucorhinia proxima at a High Altitude in Colorado (Odon.: Libellulidae).

Prof. T. D. A. Cockerell recently presented to the collection of the Academy of Natural Sciences of Philadelphia a male of this species taken at Ward, Colorado, at a swamp, on July 1, 1922, by B. Hill. Prof. Cockerell wrote: "Ward is 9230 feet altitude and so far as I can find this is by far the highest altitude for the genus. Tillyard remarks (Biol. Dragonflies, p. 315) on absence of Libellulinae at high altitudes, so the record ought to be published."

In this connection we may recall the occurrence of *Sympetrum corruptum*, of the same subfamily, at 11,000 and 13,000 ft. in Colorado (Ent. News, xxvi, p. 119). PHILIP P. CALVERT.

Insects Taken at Hot Springs, Rotorua, New Zealand.

The past summer it was my good fortune to be associated with the University of Iowa expedition to the Fiji Islands and New Zealand in the capacity of entomologist and ornithologist. During the course of my stay in New Zealand a side trip to the Rotorua district was made and some collecting was indulged in there. The hot springs, so alluring to all, were visited and some of the entomological findings are here recorded briefly.

The center of the so-called thermal district in New Zealand is in the North Island at Rotorua, which has a population, exclusive of the tourists, of about 2000. Rotorua is about 170 miles southeast of Auckland, 800 feet above sea level and has been the scene of a great amount of volcanic and thermal activity, the sulphurous fumes and streets of volcanic ash constantly reminding one of these occurrences. Owing

[2] *Cf.* Hagen, Stet. Ent. Zeit. xxiv, p. 373, 1863; Proc. Bost. Soc. Nat. Hist. xvi, p. 359, 1874.

to the fact that the waters of the region possess certain curative properties, many hotels and bath houses are maintained for the accommodation of the public. Several of these are under government supervision.

At the north edge of the town, immediately facing Lake Rotorua, is a native Maori village known as Ohinemutu and it was along the lake shores in front of this village that the observations recorded below were made. Here, hot or boiling water issues from the sandy ground in the form of miniature geysers the water from them uniting shortly to form numerous small pools and streams which ultimately flow into Lake Rotorua. Some of these streams are as much as six inches in depth while others are only one or two inches deep.

Certain insects seem to be attracted by the heated earth in the vicinity of the bubbling hot water, the heat being great enough to be felt through the soles of heavy collecting shoes as one walks over it. If the insects on the sand are disturbed some jump or fall into the hot water and are killed. A good many were thus taken from the shallow streams as they were being carried to the lake a few yards away. Covering the margins and bottoms of most of the streams and pools, is a slimy dark green vegetable growth of varying thickness, which serves as food for some kinds of insects and gives an added incentive for them to visit the region.

On July 27 and again on July 31 several species of flies (Diptera) were found in this situation; one, a small blackish form was very abundant on the warm sand. Another large, black, active species fed greedily on the algae growing in the hot water and along its edge. In some instances the flies rested on the surface of the water while feeding, but if accidentally immersed in it they quickly succumbed, thus indicating that they are not totally immune to the effects of the hot water. A species of crane fly was also found feeding on the algae growing on the hot sand.

Of Hemiptera, two species were taken; one, a small blackish heteropteran in both nymphal and adult stages, was found on the algae around the hot springs, while small water striders glibly glided over the surface apparently suffering no inconvenience from the heated supporting medium.

In the water a species of small hydrophilid beetle (Coleoptera) as well as its larva was taken and here, too, fly larvae were found breeding.

At least five species of insects representing three different and distinct orders were taken in, on or in the immediate vicinity of the hot springs. In the case of those insects which breed in the water some interesting items of ecological significance are suggested. Apparently abundant food and a considerable freedom from enemies is afforded. A constant temperature is maintained throughout the year so that the need for a definite breeding season is eliminated although the climatic

conditions of winter and summer are well marked. It would be interesting to know to what degree, if any, these insects have changed their nature by long and continued residence in the hot water.—DAYTON STONER, University of Iowa, Iowa City, Iowa.

Entomologische Mitteilungen.

Dr. Walther Horn, of the Deutsches Entomologisches Museum, Berlin-Dahlem, Gossler-Str. 20, Germany, writes that his Museum lacks financial support and is hardly able to continue its existence. The publication which he issues, namely *Entomologische Mitteilungen*, is critically feeling the financial conditions of Germany, and especially the monetary exchange. Prices of printing have risen enormously, and hopes for the future are very dim. On account of the condition of the exchange, subscriptions to the journal when sent in German marks are not welcome, because of the constant and extremely rapid decline in value of the mark. Doctor Horn wishes that American subscribers to the journal should send their subscription price ($1.25) in American money; and if this is done, and if more subscriptions are sent in, he hopes that the journal may be able to continue.

L. O. HOWARD.

An Interesting New Case of Phoresie (Heterop.: Coreidae; Hymen.: Proctotrypidae).

Anoplocnemis curvipes is a Coreid which is very injurious to vegetable crops, especially legumes, in the Belgian Congo. Lieut. Jean Ghesquière, Entomologist to the Belgian Congo, in a brief note in the Bulletin of Agriculture of the Belgian Congo for 1921, of which he has just sent me an author's extra, described the habits of an egg-parasite of this bug, and they are extremely interesting. The parasite is not identified, but is referred to as a Proctotrypid. From the illustration, it would seem to be a *Telenomus*, or at least a Telenomine. Lieutenant Ghesquière states that the parasite flies around over the plants which are actively visited by the bug, and when a female parasite gets the chance she jumps upon the pronotum or the top of the head of the bug. She tries to find females especially, but, failing the females, she will jump on the head of a male; never, however, will she mount larvae or nymphs of the bug. If she finds herself on the head or back of a male, at the moment when the bugs couple she passes to the female. The egg-laying of the *Anoplocnemis* takes place a few minutes after coupling, and the parasite then leaves the adult bug, but lays its eggs in the eggs which are laid. After egg-laying is completed, she resumes her earlier position on the head of the female host.—L. O. HOWARD, U. S. Bureau of Entomology, Washington, D. C.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, Guelph, Canada. **5**—Psyche, Cambridge, Mass. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **13**—Journal of Entomology and Zoology, Claremont, Cal. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **20**—Bulletin de la Societe Entomologique de France, Paris. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **39**—The Florida Entomologist, Gainesville, Florida. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipzig. **64**—Parasitology, London. **67**—Le Naturaliste Canadien, Quebec. **68**—Science, Garrison on the Hudson, N. Y. **76**—Nature, London. **82**—The Ohio Journal of Science, Columbus, Ohio. **85**—The Journal of Experimental Zoology, Philadelphia. **88**—Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor. **91**—The Scientific Monthly, Lancaster, Pa. **92**—Archives de Zoologie Experimentale et Generale, Paris. **95**—Annales des Sciences Naturelles, Paris, Zoologie. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **111**—Archiv fur Naturgeschichte, Berlin. **115**—Societas Entomologica, Stuttgart.

GENERAL. Essig, E. O.—Insect notes from Laguna Beach, Cal. **13,** xiv, 75-8. **Hartman, C.**—Swarming insects simulating smoke. **68,** lvii, 149-50. **Latour, B.**—Insectes d'autrefois. **67,** xlix, 127-31. **Martin & McKittrich.**—A key for the identification of animal parasites found in the human feces. (Bul. Univ. Wisconsin, iv, 371-94, 1917). **Muller, G. W.**—Insektenlarven an wurzeln von wasserplanzen. (Mitt. Naturw. Ver. Neuvorpom. u. Rugen in Greifswald, Berlin, xlviii, 30-47). **Robson, G. C.**—A note on the species as a gene-complex. **11,** xi, 111-15. **Sharp, David**—Obituary note of **10,** xxiv, 207. **Stiles, C. W.**—Zoological nomenclature: Musca and Cal-

liphora. **76,** cxi, 115. **Wheeler, W. M.**—Social life among the insects. VI. The termites or "white ants." **91,** xvi, 160-77 (cont.)

ANATOMY, PHYSIOLOGY, ETC. Burge, W. E.—A comparison of the catalase content of luminous and non-luminous insects. (Abs-Bul. Nela Res. Lab. Gen. Elect. Co., Cleveland, Ohio, i, 448-9.) **Dehorne, A.**—Determination du nombre des chromosomes dans les larves de Corethra plumicornis. **92,** lviii, 25-30. **Janet, C.**—Considerations sur l'etre vivant. Pt. 2, L'individu la sexualite, la parthenogenese et la mort, au poit de vue orthobiontique. Beauvais, 1921, 196pp. **Kopec, S.**—The influence of the system on the development and regeneration of muscles and integument in insects. **85,** xxxvii, 15-25.

THE SMALLER ORDERS OF INSECTA. McDunnough, J.—Notes on Canadian dragonflies for the season 1922. **4,** liv, 255-7. **Nakahara, W.**—Notes on the feeding habits of scorpion-flies. **5,** xxix, 212-13.

Needham & Claassen.—The N. Am. species of the genus Acroneuria. **4,** liv, 249-55. **Watson, J. R.**—On a collection of Thysanoptera from Rabun Co., Georgia. A new thrips from citrus in Alabama. **39,** vi, 33-9, 47-8; 45.

ORTHOPTERA. Hebard, M.—Dermaptera and Orthoptera from the state of Sinaloa, Mexico. Pt. 1. **2,** xlviii, 157-96. **Hubbell, T. H.**—Notes on the Orthoptera of North Dakota. The Dermaptera and Orthoptera of Berrien County, Michigan. **88,** No. 113; No. 116. **Macfie, J. W. S.**—Observations on the role of cockroaches in disease. **98,** xvi, 441-48. **Morse, A. P.**—The European house cricket; hearth cricket. **5,** xxix, 225.

HEMIPTERA. Bergroth, E.—On some Neotropical Tingidae. **33,** lxii, 149-52. **Drake, K. J.**—Neotropical Tingitidae with descriptions of three new genera and thirty-two n. sps. and var. (Mem. Carnegie Mus., ix, 351-78.) **Ferris, G. E.**—Notes on Coccidae X. **4,** liv, 246-8. **Hungerford, H. B.**—Oxyhaemoglobin present in backswimmer, Buenoa margaritacea. **4,** liv, 262-3. **Hussey, R. F.**—Hemipterological notes. **5,** xxix, 229-33. (Hemiptera from North Dakota.) On some Hemiptera from Berrien Co., Michigan. **88,** No. 115; No. 118. **Peneau, J.**—Troisieme contribution a l'etude des metamorphoses des Hemipteres. (Bul. Soc. Sci. Nat. Ouest de la France. 1921, 35-43.) **Poisson, R.**—Armature genitale et squellette chitineux de l'organe copulateur chez les hemipteres aquatiques. **20,** 1922, 269-74. **Weiss & West.**—Notes on Livia maculipennis. **5,** xxix, 226-9.

Knight, H. H.—The N. Am. species of Labops. **4,** liv, 258-61. **Metcalf, Z. P.**—On the genus Elidiptera. **4,** liv, 263-4.

LEPIDOPTERA. Bowditch, F. C.—Notes on the gipsy moth in my unsprayed woods at East Marion, Mass., 1922. **5,** xxix, 213-16. **Hoffmann, C. C.**—Restos de una Antigua del Norte entre los lepidopteros Mexicanos. (Rev. Mex. Biol., iii, 1-37.) **Moore, S.**—A list of northern Michigan L. **88,** No. 114. **Schaus, W.**—Notes on the Neotropical Epipaschiinae, with descriptions of new g. and sps. **10,** xxiv, 208-41. New sps. of Hydriomena from Mexico and Guatemala. **15,** x, 205-18.

DIPTERA. Akehurst, S. C.—Larva of Chaoborus crystalinus (Corethra plumicornis). (Jour. R. Micros. Soc., 1922, 341-72.) **Aldrich, J. M.**—The Neotropical muscoid genus Mesembrinella, and other testaceous muscoid flies. **50,** lxii, Art. 11. **Dyar, H. G.**—Notes on tropical American mosquitoes. **15,** x, 188-96. **Stiles, C. W.**—Musca Linnaeus, 1758, and Calliphora Desvoidy, 1830. **68,** lvii, 176. **Young, C. J.**—Notes on the bionomics of Stegomyia calopus, in Brazil. **98,** xvi, 389-406, 425-39. **Warburton, C.**—The warble-flies of cattle. Hypoderma bovis and H. lineatum. **64,** xiv, 322-41.

Garret, C. B. D.—New sps. of Helomyzidae. **15,** x, 175-7.

COLEOPTERA. Bounoure, L.—Anomalie d'une larve de "Dytiscus." **95,** v, 391-97. **Burke, Hartman, & Snyder.**—The lead-cable borer or "short-circuit beetle" in California. (U. S. Dept. Agr., Bull. 1107.) **Dabbert, H.**—Ein hermaphrodit von Dytiscus marginalis. **115,** xxxviii, 1-3. **Fisher, W. S.**—The leaf and twig mining buprestid beetles of Mexico and Central America. **50,** lxii, Art. 8. **Herrera, M.**—Breve monografia del Megasoma elephas. (Secret. Agric. y. Fomento. Direc. Estudios Biol., Mexico. 1922. 16pp.) **Macnamara, C.** Tiger beetle larvae. **4,** liv., 241-6. **Obenberger, J.**—Beitrage zur kenntnis der Buprestiden. **111,** 1922, A, 12, 64-168.

HYMENOPTERA. Browne, F. B.—On the life-history of Melittobia ascasta; a chalcid parasite of bees and wasps. **64,** xiv, 349-70. **Cresson, E. T., Jr.**—The Bassett types of Cynipidae. **2,** xlviii, 197-203. **Cushman, R. A.**—The identity of Ichneumon coccinellae. **10,** xxiv, 241-2. **Enderlein, G.**—Beitrage zur kenntnis der Copeognathen VII. **52,** lv, 245-8. **Gennerich, J.**—Morphologische und biologische untersuchungen der putzapparate der H. **111,** 1922, A, 12, 1-63. **Hartley, E. A.**—Some bionomics of Aphelinus semiflavus, chalcid parasite of aphids. **82,** xxii, 209-36. **Plath, O. E.**—Notes on the nesting habits of several N. Am. bumble bees. **5,** xxix, 189-202. **Smulyan, M. T.**—New England sawflies of the genus Tenthredella. (Proc. Boston Soc. N. H., xxxvi, 383-465.) **Stuart, M.**—Amber and the dammar of living bees. **76,** cxi, 83-4. **Wheeler & Chapman**—The mating of Diacamma. **5,** xxix, 203-211.

Insects of Ecuador.

Catalogo Sistematico y Sinonimico de los Odonatos del Ecuador. Por el Prof. Francisco Campos R., Zoólogo del Estado (1905), Catedrático de Ciencias Naturales y Cosmografia en el Colegio Nacional Vicente Rocafuerte. Revista, Coleg. Nac. Vic. Rocafuerte, Guayaquil, Año IV., Núms. 8 y 9, pp. 1-75, lam. 1-3. June—September, 1922.

For the past twenty-two years the author has occupied the chair of natural history in the College of Vicente Rocafuerte at Guayaquil and has devoted his free hours from professional duties to the cultivation of entomology. Papers by him on Heteroptera, Lepidoptera, Diptera, Coleoptera, Hymenoptera, Neuroptera, Trichoptera and Euplexoptera of Ecuador have appeared in earlier numbers of the *Revista* of the College from 1919 on. In the study of all of these groups he has sought the assistance of specialists in America and in Europe to determine the material which he and his friends have collected in the Republic of the Equator.

The present catalog embraces 126 species of Odonata, without including varieties and doubtful forms, belonging to 54 genera. Seven species are indicated from the Galapagos Islands, three were described as new from the author's material, 5 are still to be described and 52 were not recorded from Ecuador previous to their collection by the author. 'Many other species,' he adds, 'must surely inhabit the country, since they are mentioned from bordering regions, but I have preferred to omit these from my catalog, signalizing only those for which there are definite evidences of capture in the national territory.' Species reported from Ecuador in the existing literature, or whose occurrence therein rests on manuscript communications to the author by specialists, have, of course, been included, although many of these species are simply recorded as from "Ecuador." A list of Ecuadorian localities, with their altitudes in meters, chiefly those at which the author and his friends have collected, is given on pages 9 and 10. It consists of 29 localities in western Ecuador, 5 to 1280 meters, 14 in interandine Ecuador, 2588-3288 meters, and 3 in eastern Ecuador, 440-1800 meters.

Under each species is given the bibliographical references, including synonyms, the localities and months in Ecuador and not infrequently a note on habits. There are three half-tone plates showing the facies of 9 species of Zygoptera, 6 Aeschnidae and 10 Libellulidae, respectively.

We congratulate Prof. Campos on the publication of his catalog and hope that he may for many years continue his studies and enlarge still more our knowledge of the Odonata of his country.

Prof. Campos' Estudios sobre la Fauna Entomologica del Ecuador. 3. Coleopteros occupies pages 24-100 of the same *Revista* for December, 1921, and lists 548 species of 342 genera belonging to 62 families, from the literature and from his own collections. Three half-tone plates reproduce photographs of 28 species. Nos. 4, 5, 6 and 7 of the Estudios were published in the *Revista*, Año IV, Num. 7, for March, 1922, and deal respectively with the Hymenoptera (pp. 54-71, 2 half-tone plates of 13 spp.), 113 species of 50 genera; Neuroptera (pp. 71-73, 1 half-tone plate of 2 spp.), 14 spp. of Myrmeleonidae and Ascalaphidae; Trichoptera (p. 74), 2 spp. and Euplexoptera (pp. 74-77), 18 spp.

Philip P. Calvert.

Doings of Societies.

Entomological Section, The Academy of Natural Sciences of Philadelphia.

Meeting of September 28, 1922. Nine persons present. Director Laurent presiding. Mr. Frank R. Mason was elected a member.

LEPIDOPTERA.—Mr. Williams exhibited drawings of the male genitalia of the North American species of *Hesperia* and allied genera, and made some remarks on the strong characters presented by these organs and their value in determining species.

ODONATA.—Dr. Calvert presented eight specimens of Odonata from New Jersey and Pennsylvania to the collection. He also exhibited a male of *Gomphus dilatatus* Rambur, collected by Mr. Philip Laurent, at Gunntown, Florida, March 1-15, 1922, and remarked on the specific characters furnished by the terminal filaments of the penis. [Published in detail on page 87 of this number of the NEWS.] He also read a passage from "Our Search for a Wilderness," by M. B. and C. W. Beebe, describing a species of *Mecistogaster* capturing spiders in British Guiana, and exhibited a *Megaloprepus coerulatus* from Costa Rica which had a spider in its mouth at the time of capture; also a microscopic slide of the excrement of another *M. coerulatus* from the same country, in which a bit of the last tarsal joint and claws of a spider were visible.

Meeting of November 16, 1922. Director Philip Laurent in the chair. Nine persons present.

DIPLOPODA.—Dr. Skinner read a letter about an infestation by millipedes of a house at Haverford. Mr. Kisliuk reported an infestation of a field of imported bleeding-hearts by this pest working in the roots and destroying the entire planting.

LEPIDOPTERA.—Mr. Williams spoke about some more of his researches in the lepidopterous family Hesperiidae, showing some important genitalic characteristics by lantern projection of microscopic mounts.

DIPTERA.—Mr. Cresson made some comments on the more conspicuous genitalic structures in the dipterous family Micropezidae, illustrating his remarks by lantern projection of drawings. Mr. Laurent commented on the diversity of terms used for the same parts of the genitalic structure.—E. T. CRESSON, JR., Recorder.

The American Entomological Society.

Meeting of October 19, 1922, in the hall of the Academy of Natural Sciences of Philadelphia. Dr. Henry Skinner, president, in the chair. Eleven persons present.

Mr. Cresson reported the following additions to the collection: 25 specimens (14 species) Hemiptera (Aradidae), United States, C. W. Drake; 23 specimens (12 species, 15 paratypes) Diptera Dolichopodi-

dae) United States, M. C. Van Duzee; 11 specimens Diptera from Florida, Philip Laurent; Paratype of *Zorotypus swezeyi*, Caudell, A. N. Caudell; 2 paratypes of two species Diptera from Illinois; 2 paratypes of 3 species Evaniidae from Peru; 3 Hymenoptera, Illinois and Peru, T. H. Frison; 2 paratypes of *Bremus kirbyellus alexanderi, Bremus sylvicola lutzii*, from United States, T. H. Frison; 2 specimens *Celeris calida* Butler, Lep. 15 specimens *Crabro destructor* from Hawaiian Islands, F. X. Williams, 1 Diptera, *Orophoro townsendi* Bez., type from Peru; 14 Diptera Trypetidae determined from Africa, Prof. M. Bezzi; 8 specimens (4 species) *Drosophila* (Diptera) Penna., Dr. P. P. Calvert; 5 specimens *Longitarsus subrufus* LeC. from Penna., F. M. Craighead; 1 photo of Frank R. Mason; 6 copy books containing numerous letters to entomologists and many other letters from entomologists to Mr. H. F. Bassett from his daughter, Mrs. Howard W. Ford; 78 photographs of entomologists purchased from Deutsche Entomologische Institut, Berlin.

ORTHOPTERA.—Mr. Rehn made a few remarks on the rarity of a fissate condition of the pronotum in the Blattidae. The speaker exhibited the genera *Schigopilia* and *Schistopeltis* of the Panchlorinae, which possess such fissations, while tendencies toward this type, as found in several related genera, were also pointed out.

LEPIDOPTERA.—Mr. Bayliss reported the capture of *Apatura celtis* (Lep.) at Burlington, New Jersey, this species not being recorded in Smith's list.

COLEOPTERA.—He exhibited a fine collection of the local Cicindela (Coleop.)

DIPTERA.—Mr. Kisliuk reported the presence of the Lesser Bulb fly larvae on Narcissus bulbs imported from Holland and exhibited adults and pupa of *Eumerus strigatus*, Fab. (Dipt.). Shipments of the plants were held up and thoroughly fumigated and action taken to prevent the introduction of the insect in this manner.

Mr. Rehn made some interesting remarks in regard to his last collecting trip with Mr. Hebard, particularly in Arizona.

R. C. WILLIAMS, *Recording Secretary.*

Meeting of December 11, 1922, in the same hall. Dr. Skinner presiding. Twelve persons present.

The annual reports were read and the following were elected to serve as officers and committees for 1923: *President*, Henry Skinner; *Vice-President*, J. A. G. Rehn; *Corresponding Secretary*, Morgan Hebard; *Recording Secretary*, R. C. Williams; *Treasurer*, E. T. Cresson. *Publication Committee*, J. A. G. Rehn, *Chairman*, E. T. Cresson, P. P. Calvert; *Finance Committee*, Morgan Hebard, *Chairman*, D. M. Castle, J. A. G. Rehn; *Property Committee*, E. T. Cresson, Jr., Morgan Hebard, Philip Laurent.—J. A. G. REHN, *Recording Secretary, pro tem.*

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Buprestidae, Cleridae, and **Carabinae** wanted from U. S. or Buprestidae of the world. Will collect insects of any group (except Lepidoptera) in exchange or pay cash. Alan S. Nicolay, 416a Grand Ave., Brooklyn, New York.

For Exchange—A large number of live cocoons of Callosamia promethea, C. cynthia and P. cecropia for other pupae or Lepidoptera. D. C. Heim, Sunbury, Pa.

Wanted to Exchange—N. A. Coleoptera for same not in my collection. Carl Selinger, 4419 Dover St., Chicago, Ill.

Wanted for Cash or Exchange—Catocala eggs, also brilliant colored butterflies and moths for trays. Mrs. Robert Milde, Lewiston, Minn.

Syrphidae from all parts of North America wanted. Monographing the family.—C. H. Curran, Department of Entomology, University of Kansas, Lawrence, Kansas.

Will collect in all orders except Lepidoptera, in exchange for Cerambycidae (longicorn beetles) and Pentatomidae (stink-bugs). G. Chagnon, P. O. Box 521, Montreal, Canada.

I will collect Coleoptera and Lepidoptera in southwest Arkansas for those so interested.—Miss Louise Knobel, 417 West 2nd Avenue, Hope, Arkansas.

Correspondence solicited from anyone desiring general collections of insects, to be made in Costa Rica. Austin Smith, Apartado 412, San José, Costa Rica.

Wanted—For cash, during winter of 1922 and 1923, pupae of Saturniid moths. Please state species, quantity and price. P. Rau, 2819 S. Kingshighway, St. Louis.

Wanted—Am working on a Revision of the Buprestidae of the West Indies and would like to examine any material in this family from that region. W. S. Fisher, U. S. National Museum, Washington, D. C.

For Exchange—A large number of Papilio Turnus, P. Cresphontes and P. Ajax pupae, or the same specimens in papers, for other pupae or Lepidoptera. Carl Selinger, 4419 Dover St., Chicago, Ill.

Wanted—Dytiscidae not in my collection, in exchange for local specimens. Offer Coelambus sellatus, Oregonus, etc. F. S. Carr, 11050 123rd St., Edmonton, Alberta.

Coleoptera for exchange—Cicin. generosa, hirticollis, modesta, sexguttata, 12-punctata, Saperda populnea, Uro. fasciata, Donacia subtilis, palmata, texana-minor, biimpressa, refuscens. Ernest Baylis, 5011 Saul St., Philadelphia, Pa.

Endomychidae. I desire to purchase representatives of this family from any part of the world. Particularly desire specimens from the western and southwestern part of the U. S. L. B. Walton, Kenyon College, Gambier, Ohio.

RECENT LITERATURE

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GENERAL.

832.—**Crampton** (G. C.).—The genitalia of male Diptera and Mecoptera compared with those of related insects, from the standpoint of phylogeny. (Trans., **48**, 207-225, 3 pls., 1923) ..... .50

DIPTERA.

833.—**Malloch** (J. R.).—Flies of the anthomyiid genus Phaonia and related genera, known to occur in N. A. (Trans., **48**, 227-282, 3 pls., 1923)..... 1.25

HYMENOPTERA.

830.—**Cresson** (E. T., Jr.).—The Bassett types of Cynipidae. (Trans., **48**, 197-203, 1923)..... .15

LEPIDOPTERA.

831.—**Bell** (E. L.).—A new species of Hesperiidae. (Trans., **48**, 205-206, 1923) ..... .10

ORTHOPTERA.

829.—**Hebard** (M.).—Dermaptera and Orthoptera from the state of Sinaloa, Mexico, Pt. I. Dermaptera and non-saltatorial Orthoptera. (Trans., **48**, 157-196, 2 pls., 1923) ..... .85

Of Interest to Specialists.

The American Entomological Society has placed in operation a system by which entomologists who are not situated near the larger reference libraries, or who desire to build up special entomological libraries of their own and yet do not care to subscribe to the annual volume of the Society's "Transactions," may secure copies of the papers appearing in the Society's publications promptly after their receipt from the press.

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Need American Entomologist III (N. S. I.) No. 12; Bulletin Brooklyn Entomological Society VI, VIII, IX and X No. 2 and index; Ann. Repts. Entomological Society Ontario, II, III, IV, IX; Entomologica Americana, VI; U. S. D. A. Bureau of Entomology bulletins, old series, 2, 3, 9, 20, 33.

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